

## SUBJECT INDEX

- Abra alba* 187  
*Adelomedon ancilla* 217, 218, 220, 223, 225, 227, 229  
 Adorius Islands, Holocene sea level evidence 361  
 Aeolian dust 235-7  
   deposition rates 250  
   entrainment factors  
     environment 240-1  
     meteorology 242-4  
     sediment supply 237-40  
   transport 245-9  
 Aeolianites in Cape Province 290  
 Africa  
   Holocene sea level evidence 361  
   regional studies  
     East  
       peat studies 207-11  
     South  
       Cenozoic sea level studies 286-7  
       see also Cape Province  
     West  
       climate 45-6, 51-3  
       palaeohydrology 46-9, 51-2  
       palynology 49-51  
 Agassiz, Lake 303, 305  
 Aitutaki and Rarotonga Islands, Holocene sea level evidence 363  
 Alleröd 296, 297  
 Alluvial floodplain and dust entrainment 240  
*Alnus* distribution in Central and South America 10  
 Altenwalder Staffel 25-6  
 Amazon Basin pollen record 7, 9  
 America  
   Central see Central America  
   North see North America  
   South see South America  
 Amersfoort interstadial 36  
*Amiantis purpurata* 217-220  
 Amino acid racemization ages  
   genus effects 217  
   kinetics 353-6  
   marine terraces  
     methods 256-7  
     results 257-60  
     results discussed 260-1  
   measurements 163-6  
   results 219, 220-2, 223-4, 225-7, 227-8, 229  
   shell structure effects 217-18  
*Ammonia batavus* 187  
 Anastasia Formation 160  
 Angola, Holocene sea level evidence 361  
 Annobon, Holocene sea level evidence 361  
 Antarctica, Holocene sea level evidence 363-4  
*Aporhais pes-pellicana* 188  
*Arca* racemization results 164  
 Archaeology of Mexican Indians 77-8  
*Arctica islandica* 188, 189, 190  
 Aridity and dust entrainment 243-4  
*Artemisia*, significance of 299  
 Atlantic Ocean (North)  
   polar fronts 298, 299  
   zoogeographic provinces 182-3  
*Aulacomya magallanica* 217, 220, 223, 225, 227, 229  
 Australia  
   aeolian studies  
     dust paths 236-7  
     storm frequency 238  
   Holocene sea level evidence 361-3  
*Axinopsida orbiculata* 184  
  
 Bahia Bustamante coastal features 224-7  
 Ballavarkish Till 321  
 Ballincash Till 320, 321, 322, 323  
  
 Ballybetagh pollen diagram 298  
 Ballycraoneen Till 337  
 Baltic Ice Lake 296, 297, 298  
 Banc-y-Warren 331  
 Barents Sea zoogeographic provinces 182  
 Barnstaple Bay 336  
 Beacon Island soil 290  
 Bebedero Laguna pollen record 15-16  
 Becancour Till 278  
 Becerra Formation 77, 78, 81  
 Belmont Formation 160, 161, 162, 165  
 Bermuda stratigraphy 160-6  
 Biostratigraphy of Last Glacial  
   Oerel 29-35  
   Western Europe 35-42  
*Bittium reticulatum* 187  
 Blackpool-Kirkham Ridge 325  
 Bone aging and racemization 193  
   measurements 193-4  
   results 194-5  
   results discussed 195-7  
 Boyne Valley 317, 319  
*Brachidontes rodriguez* 217, 220, 223, 225, 227  
*Brachidontes* racemization results 164  
 Brackenhill Beds 286, 289  
 Bradville Till 278  
 Bride Moraine 324, 327  
 Britain in Younger Dryas 298  
 Brörup interstadial 31, 32-3, 36-8  
*Buccinanops* sp. 217, 219, 220, 223  
 Burundi peat studies 207-11  
 Buyongwe Valley peat 207-8  
  
<sup>13</sup>C ratios in peats 207-11  
 Caleta Valdes coastal features 222-4  
 Cape Province  
   coastal deposits 287-90  
   coastal platform erosion 283-5  
   geomorphic events 291  
   sea level fluctuation 285-6  
   solid geology 283  
 Carbon-13 in peats 207-11  
 Carbon dioxide effects in climate modelling 140, 146-7  
 Carbonate dates from Eastern Sahara 115-17  
 Carey Valley 332  
 CARMARSEL expedition 361  
 Caroline and Marshall Islands, Holocene sea level evidence 361  
 Catastrophism in stratigraphy 280-1  
 Catfish Creek Till 279  
 Central America  
   palaeoclimate interpretation  
     montane forest zone 9-15  
     subtropical woodland and desert 15-16  
     temperate nemoral and evergreen forests 16-20  
     tropical-subtropical lowlands 3-9  
   vegetation types 2-3  
 Central Swedish Moraine 296, 297  
*Cerastoderma edule* 190  
 Chalco, Lake 78-9  
   diatom record 11, 12  
   palaeolimnology site 85-9  
*Chama* racemization results 164  
 Chapultepec (Mexico) paleolimnology site 82-5  
 Charcoal dates from Eastern Sahara 115-17  
 Chelford interstadial 38  
 Chichencanab Lake pollen record 8  
 Chile  
   Holocene sea level evidence 360  
   marine terrace studies 256-60  
*Chlamys islandica* 185, 186  
*Chlamys patinae* 217, 220, 229

- Chlorite in aeolian dusts 248  
 Ciega Stadial 12  
 Clay minerals in aeolian dusts 247-9  
 Clay pans and dust entrainment 240-1  
 Climadiagrams for Central and South America 6  
 Climate analyses  
   biostratigraphy in Weichsel Europe 38-40  
   dust entrainment effects 243  
   Japan  
     Holocene 272-3  
     Last Glacial 268-72  
     Last Interglacial 267-8  
   modelling in Younger Dryas 300-2  
   sea level relationships 364-5  
*Clinocardium cilatum* 184  
 Clyde Beds 184-5, 338  
 Cochrane advance 278  
 Collagen racemization and bone aging 193  
   measurements 193-4  
   results 194-5  
   results discussed 195-7  
 Cook Islands, Holocene sea level evidence 363  
*Corbula gibba* 188  
 Cordillera Oriental vegetation zonation 10  
 Corton Sands 68, 69, 72  
 Corton type site 72  
 Courtmacsherry 337  
 Cover Sands in Cape Province 290  
*Crepidula dilatata* 217, 218, 220, 223, 225, 227  
*Cryptomeria* in Japan pollen spectra 264-5  
   Last Glacial 268-72  
   Last Interglacial 267-8  
   Post Glacial 272-3  
 Cumbria, Irish Sea Basin features of 325, 333, 334  
 Cunoniaceae distribution in Central and South America 10  
 Cyperaceae and  $^{13}\text{C}$  ratios 207
- Darb el Arba'in Desert 109  
 Debris flows in drumlins cores 171-3  
 Deglaciation features 339-41  
   Irish Sea Basin 339-41  
   Laurentide 300, 303, 304  
   Sweden 297  
 Deltas, raised marine 330-5  
 Denekamp interstadial 40  
 Denmark, Late Glacial marine molluscs of 188  
 Depositional systems analysis in Irish Sea Basin 313-14  
   morainal bank complexes 316-26  
   mud drapes 335-8  
   raised marine deltas and valley fill 330-5  
   stratified glaciomarine complexes 326-30  
   subglacial system 314-16  
 Devon, Irish Sea Basin features of 336  
 Devonshire Formation 161, 162, 165  
 Diatom ecology  
   Central and South America 11, 12  
   Mexico, palaeolimnology of 79-80  
     Chalco 85-9  
     Chapultepec 82-5  
     Texcoco 91-3  
     Texepan 80-2  
     Tiapacoya 89-90  
   Sahara 124-6  
 Drumlin Readvance 170, 316  
 Drumlins  
   distribution in Irish Sea Basin 314-16  
   facies analysis  
     debris flow cored 171-3  
     drift cored 170  
     lee side stratification 173  
     subaqueous sediment cored 170-1  
     subglacial channel system cored 173  
   formation, theories of 151, 169-70  
   subglacial sediment effects 153-7  
   origins of  
     contributions of facies analysis 174-7  
     deformation theories 170  
 Dundaly Bay stratigraphy 317, 319  
 Dunefields and dust entrainment 241
- Durnten interstadial 41  
 Dust entainment studies *see* aeolian dust  
 Dust storm frequency (Australia) 238
- Ebersdorf stadial 28  
 Eem interglacial 28, 29, 31  
 El Abra Stadial 12  
 El Jonco pollen record 8  
 El Niño phenomenon 364  
 Energy Balance Climate Model 138-9  
 Epimerization of amino acids, kinetics of 353-6  
 Errol Beds 184-5, 338  
*Eurhomelea* 255  
 Eustasy *see* glacio-eustasy  
 Eutyrrhenian 166  
 Eyre Formation 240  
 Eyre Lake Basin  
   Late Pleistocene aridity 244  
   sediments 240-1
- Facies analysis and drumlins 170-4  
   implications for formation 174-7  
 Ferricretes in Cape Province 288-9  
 Fiji, Holocene sea level evidence 363  
 Floodplains and dust entrainment 240  
 Fonthill kame delta 279  
 Foraminiferal stratigraphy, Younger Dryas 298  
 Formosa Formation 286  
 Fremington Till 336
- Garryvoe Boulder Clay 337  
 Gentilly Till 278  
 Geochemistry of Eastern Sahara sediments 121-4  
 Gilbert and Ellice Islands, Holocene sea level evidence 362  
 Gimmingham Sands 69  
 Glacio-eustasy in Late Devensian Irish Sea 338-9  
 Glacio-isostasy in Late Devensian Irish Sea 338-9  
 Glaciomarine depositional system 316-38  
 Glinde interstadial 29, 30, 34-5, 40-1  
*Glycimeris* racemization results 164  
*Glycymeris longior* 217, 220  
 Great Lakes in Younger Dryas 299  
 Greatlakean (Valderan) stade 296, 299  
 Guam, Holocene sea level evidence 361  
 Guantiva Interstadial 12  
 Guinea Gulf, Holocene sea level evidence 361  
 Guinea-Sudan palaeohydrology 47-8, 53
- Halton Till 278  
 Harrington Soil 160, 161, 162  
 Hele Gravels 337  
 Hengelo interstadial 40  
 Herning stadial 29, 32  
*Heteranomia squamula* 188  
*Hiatella arctica* 184  
 Holocene transgressions  
   factors affecting  
     climate 364-5  
     latitude 364  
   southern hemisphere  
     Africa 361  
     Antarctica 363-4  
     Australia 361-3  
     Indian Ocean 361-3  
     Oceania 361-3  
     South America 359-61  
 Human impact in pollen record of South America 13  
 Huon Peninsula, Holocene sea level evidence 362
- Iceberg effects  
   climate modelling 139-40, 142-6  
   Younger Dryas 302  
 Illite in aeolian dusts 247-8  
 Inchinnan, Late Glacial molluscan assemblages 185-7  
 Indian Ocean, Holocene sea level evidence 361-3  
 Interglacial recognition in high Andes 12



- Ireland  
 drumlin studies 170-3  
 Younger Dryas 298
- Irish Sea Basin  
 deglaciation in Late Devensian 339-41  
 depositional systems analysis  
 method 313-14  
 morainal bank complexes 316-26  
 mud drapes 335-8  
 raised marine deltas and valley fill 330-5  
 stratified glaciomarine complexes 326-30  
 subglacial system 314-16  
 glaciation 310-13  
 Late Devensian history summarized 341-5  
 physiography 308-10  
 raised beaches 343  
 sea level in Late Devensian 338-9
- Irish Sea Drift 310
- Irish Sea Glacier 311
- Irish Sea Till 310, 320
- Isoleucine epimerization kinetics 353-6
- Isostasy *see* glacio-isostasy
- Jamtland interstadial 38
- Japan pollen spectra  
 Holocene 272-3  
 Last Glacial 268-72  
 Last Interglacial 267-8  
 present day 263-4
- Juglans* distribution in Central and South America 10
- Kaolinite  
 Pacific aeolian dusts 247-8  
 Sahara lake sediments 118
- Keller interstadial 40
- Kellia suborbicularis* 188
- Kirkham Ridge 325
- Knysna Formation 286-289
- Kwakwani Canal pollen record 7, 8
- Laccadive Archipelago, Holocene sea level evidence 362
- Lake level chronology in Central and South America 8, 12, 19
- Lamstedter Staffell 25-6
- Late Devensian studies *see* Irish Sea Basin
- Late Glacial molluscan assemblages 184-9
- Late Pleistocene studies *see* Australia
- Latitude and sea level relationships 364
- Laurentide deglaciation 300, 303, 304
- Lignites in Cape Province 289-90
- Littorina* spp. 185, 186
- Llyn peninsula 330-1, 333, 339-40
- Lucapinella henseli* 217, 225
- Lucina* racemization results 164
- M-beds 155
- Macoma calcaria* 185
- Malacca Strait, Holocene sea level evidence 361
- Man, Isle of 324, 327
- Marianas Islands, Holocene sea level evidence 361
- Marine terrace dating  
 methods 256-7  
 results 257-60  
 results discussed 260-1
- Mauritania, Holocene sea level evidence 361
- Mell stratigraphy 316, 317
- Melt-out till in drumlin cores 171-3
- Meltwater lens effect in climate modelling 141-2
- Mexico Basin  
 archaeology 77-8  
 geology 77  
 glaciation 77  
 palaeoclimate 97-8  
 palaeolimnology 78-9  
 diatom studies 79-80  
 Late Quaternary history 93-7  
 tephrochronology 78
- Modiolus modiolus* 186, 188
- Moershoofd interstadial 41
- Molluscs, marine  
 factors affecting fossil distribution 179-80  
 glaciomarine assemblages 184-90  
 Late Glacial distribution in NW Europe 187-9  
 modern species distribution in North Atlantic 180-2  
 use in palaeoenvironment studies 179
- Montmorillonite in aeolian dusts 249
- Morainal bank complexes 316-26
- Mulinia* 255
- Murray-Darling River Basin  
 Late Pleistocene aridity 244  
 sediments 241-2
- Mwnt 332, 333, 334
- Mya truncata* 184, 190
- Mytilis edulis* 188, 190, 217, 219, 220, 223, 225, 227, 229
- Nahanagan stadial 298
- Natica clausa* 186
- Neocatastrophism concept 277-81
- Neogloboquadrina pachyderma* 298, 299
- Neotyrrenian 166
- New Hebrides, Holocene sea level evidence 362-3
- New Zealand, Holocene sea level evidence 362
- Nissouri Stade 279, 280
- Norfolk Formation 160
- North America in Younger Dryas 298-300
- North Atlantic Deep Water (NADW) and climate modelling 146
- North Sea Drifts  
 depositional environment  
 described 66-8  
 discussed 68-71  
 description 58-64  
 occurrence 57-8
- Norway, Late Glacial marine molluscs of 188-9
- Norwich Brickearth 69
- Nothofagus* forest distribution in South America 16-19
- Nuculoma* spp. 183
- Ocean sediments and aeolian dusts 247
- Oceania, Holocene sea level evidence 361-3
- Odderade interstadial 28, 30, 32-3, 37
- Oerel Basin (West Germany)  
 biostratigraphy 29-35  
 geology 25-6  
 sediments 26-9
- Oerel interstadial 30, 33, 40-1
- Ognon II correlation 41
- Onoba semicostata* 188
- Orrisdale Till 321, 322
- Ostracode records in Central and South America 11, 12
- Oxygen isotope studies  
 aeolian dusts 249  
 Stage 5  
 Bermuda stratigraphy 166-7  
 substage sea levels 159-60  
 substage timing 159
- Pacific Ocean (North), Late Quaternary climate dynamics 273-4
- Palaeoclimate  
 areas studied  
 Eastern Sahara 134  
 Mexico, Late Quaternary 97-8  
 West Africa 51-3  
 predictive curves for 20  
 problems of interpretation 1-2  
 Palaeoecology in Eastern Sahara 132-4  
 Palaeohydrology in West Africa 46-9, 51-2  
 Palaeolimnology  
 Eastern Sahara 127-32  
 Mexico 78-9  
 Palaeomagnetic curves 210-11  
 Palaeotemperature analysis in Late Glacial 189-90  
 Paleotyrrenian 166  
 Palynology in West Africa 49-51, 52  
*see also* pollen assemblages

- Panama Canal pollen record 6, 7, 8  
 Patagonia coastal features 213, 218–29  
*Patinigeria magallanica* 217, 225, 227, 229  
 Pearlette Ash 278  
 Peat analysis for  $^{13}\text{C}$  ratios 207–11  
 Pembroke Formation 160, 161, 162  
 Perapohjola interstadial 38  
 Peru marine terrace studies 256–60  
 Peten pollen record 8  
*Phragmites* occurrence in Eastern Sahara 117  
*Picea* in Japan pollen spectra 264–5  
   Last Glacial 268–72  
   Last Interglacial 267–8  
   Post Glacial 272–3  
*Pinus* distribution in pollen spectra  
   Central and South America 10  
   Japan 264–5  
     Last Glacial 268–72  
     Last Interglacial 267–8  
     Post Glacial 272–3  
*Pitar rostrata* 217, 219, 220, 223, 225, 229  
 Playa lakes and dust entrainment 240–1  
 Pleni-Weichselian biostratigraphy  
   Oerel 33–5  
   Western Europe 40–2  
*Podocarpus* distribution in Central and South America 10  
 Polar front positions in Late Glacial 189–90  
 Pollen assemblages  
   Holocene  
     Central and South America  
       Central Highlands 11  
       Paramo/Puna-SubParamo-AltoAndean 134  
       South Andean forest 17  
       tropical-subtropical lowlands 7  
       woodland and desert 16  
     Eastern Sahara sediments 126–7  
   Late Quaternary of Japan  
     discussion of results 267–73  
     implications for climate 273–5  
     methods of analysis 264–7  
   see also palynology  
 Port Bruce Stade 279  
 Port Stanley Till 280  
 Port Talbot I interstadial 278  
*Portlandia arctica* 184, 189  
 Proteaceae distribution in Central and South America 10  
*Protothaca* 255  
   *P. antiqua* 217, 223, 225  
 Puerto Deseado coastal features 227–8
- Q-beds 155  
 Quartz in aeolian dusts 248–9  
*Quercus* distribution in pollen spectra  
   Central and South America 10  
   Japan 264–5  
     Last Glacial 268–72  
     Last Interglacial 267–8  
     Post Glacial 272–3
- Ra Moraine 296  
*Rabilimis mirabilis* 188  
 Racemization see collagen racemization, also amino acid racemization  
 Radiocarbon dating, limitations of 277–8  
 Radiolaria in climate analysis  
   methods 265–7  
   results 267, 268, 269, 270  
 Raised beach ridges  
   correlations 230–2  
   descriptions 213  
     Bahia Busamante 224–7  
     Caleta Valdes 222–4  
     Puerto Deseado 227–8  
     San Antonio Oeste 219–22  
     San Blas 218–19  
     Tierra del Fuego 228–9  
 Raised beaches  
   Cape Province 286
- Irish Sea Basin 343  
 Raised marine delta features 330–5  
 Rederstall stadial 28, 32  
 Rodebaek interstadial 36  
 Rolling Down Group 240
- Sahara  
   oasis studies see Selima Oasis  
   palaeohydrology 49, 53  
 Sahel palaeohydrology 48–9, 53  
 St Bees 333, 334  
 St George's Soil 161  
 St Germain I and II correlations 35, 38  
 Salinity effects in Younger Dryas 302  
 Salmon Springs glaciation 278  
 Salpausselka moraine 296  
*Samarangia exalbida* 217, 220  
 San Antonio Oeste coastal features 219–22  
 San Blas coastal features 218–19  
 Sangamon Soil 278  
 Sao, Holocene sea level evidence 361  
 Saunton Sands 337  
 Schalkholz stadial 28, 33  
 Scilly Till 336  
 Scotland, Late Glacial marine molluscs of 187–8  
 Scottish Readvance 325  
 Screen Hills 320, 321, 322, 324, 326, 327  
 Sea Ice Model 139  
 Sea level changes 214–15  
   Cenozoic  
     Cape Province 286  
   Holocene  
     factors affecting 364–5  
     southern hemisphere  
       Africa 361  
       Antarctica 363–4  
       Australia 361–3  
       Indian Ocean 361–3  
       Oceania 361–3  
       South America 359–61  
   Late Devensian 338–9  
   Stage 5 159–60  
 Sedgefield terrace 286  
 Selima Oasis  
   climate 111  
   description 110–11  
   geology 111–12  
   lake sediment analysis  
     methods 112–14  
     results 114–27  
   palaeoecology 132–4  
   palaeolimnological history 127–32  
   vegetation 112  
 Senegal, Holocene sea level evidence 361  
 Sheet flows in drumlin cores 171–3  
 Shore Hills Soil 161  
 Silcretes in Cape Province 288–9  
 Society Islands, Holocene sea level evidence 363  
 Solway Firth, Irish Sea Basin features of 325, 338  
 South Africa  
   Holocene sea level evidence 361  
   see also Cape Province  
 South America  
   Holocene sea level evidence 359–61  
   palaeoclimate interpretation  
     montane forest zone 9–15  
     subtropical woodland and desert 15–16  
     temperate nemoral and evergreen forests 16–20  
     tropical-subtropical lowlands 3–9  
   vegetation types 2–3  
   see also Chile; Patagonia; Peru  
 Southampton Formation 160, 161, 162–3, 165, 166  
 Southern Oscillation Index 364  
 Spencer's Point Formation 161, 162, 166  
 Sri Lanka, Holocene sea level evidence 362  
 Stratigraphy problems in Quaternary 277–81  
 Subglacial environments 152–3  
   bed conditions 153–5  
   bedforms 155–7

- channel stratigraphy in drumlin cores 173
- depositional systems analysis 314-16
- Sudan (South) palaeohydrology 47-8
- Sunnybrook Till 278, 280
- Susaca Interstadial 12
- Swartvlei terrace 286
- Sweden
  - Late Glacial marine molluscs 188
  - Younger Dryas 296-8
- Tagelus* 255
- Tagua Lake pollen record 15-16
- Tanganyika Lake peat 208-10
- Tephrochronology in Mexico 78
- Texcoco Lake 78-9
  - diatom record 11, 12
  - palaeolimnology site 91-3
- Texepan Man 77-8, 81
- Texepan (Mexico) paleolimnology site 80-2
- Thome, Holocene sea level evidence 361
- Thracia papyracea* 188
- Thyasira gouldi* 187
- Tiapacoya Lake
  - diatom record 11, 12
  - paleolimnology site 89-90
- Tierra del Fuego
  - coastal features 228-9
  - Holocene sea level evidence 361
- Tonga, Holocene sea level evidence 363
- Trachycardium* 255
- Tridonta* spp. 183
- Tusmotu Islands, Holocene sea level evidence 363
- Tufa deposits in Eastern Sahara sediments 117, 130
- Tunnel valleys 312, 326-30
- Two Creeks forest bed 299
- Typha* occurrence in Eastern Sahara 115
- U-beds 153-5
- Uniformitarianism in stratigraphy 280-1
- Valderan (Greatlakean) stade 296, 299
- Valders advance 278
- Valdivian rainforest palaeoclimate 18
- Valencia Lake pollen record 8
- Vedde volcanic ash 298
- Wales, Irish Sea Basin features of 330-1, 335
- Walsingham Formation 161, 162
- Wando Formation 160
- Wascana Creek Ash 278
- Weather patterns and dust entrainment 242-5
- Weichselian
  - biostratigraphy
    - Oerel 29-33
    - Western Europe 40-2
  - interstadial correlations 35-42
- Wind systems and dust entrainment 242-5
- Wrexham Delta Terrace 342
- Xatocan, Lake 78-9
- Xochimilco, Lake 78-9
- Yoldiella* spp. 184, 185, 187
- Younger Dryas climatic change 296
  - evidence
    - Britain 298
    - Ireland 298
    - North America 298-300
    - North Atlantic 298, 299
    - Sweden 296-8
  - factors affecting 137-8, 202-5
  - factors evaluated 147-8
  - modelling of 300-2
    - carbon dioxide factor 140, 146-7
    - energy balance 138-9
    - iceberg factors 139-40, 142-6
    - meltwater lens effect 141-2
    - North Atlantic Deep Water formation 146
    - sea ice 139
- Zacapu Basin diatom record 11, 12
- Zea* pollen record in Central and South America 12
- Zidona dufresnei* 217, 218, 219, 223
- Zirfaea crispata* 188
- Zoogeography of North Atlantic 182-3
- Zumpango, Lake 78-9





